

A NEW SPECIES OF GOBIID FISH, *Callogobius stellatus*,
FROM FLORES ISLAND, INDONESIA
(TELEOSTEI: GOBIIDAE)

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Abstract.—*Callogobius stellatus*, a new species of the fish family Gobiidae, is described from Flores Island, Indonesia. *Callogobius stellatus* is most closely related to *Callogobius mannarensis* Rangarajan which is known only from the Gulf of Mannar, southern India. These two species differ from all other members of the genus in having a reduced sensory pore system consisting only of the nasal, anterior otic and intertemporal pores, a vertebral number of almost always 11 precaudal and 15 caudal vertebrae and a characteristic color pattern consisting of body saddles, a pectoral ocellus, a dark, oblique cheek mark and a large dark, wedge-like mark on the caudal fin. *C. stellatus* differs from *C. mannarensis* mainly in its coloration, such as the dark, oblique cheek bar not extending to opercle and not joining with dark saddle on nape, a large, dark oval-shaped spot on fleshy base of pectoral fin, a distinct saddle on mid-trunk, and a pale to light basi-caudal bar that is not divided mid-laterally by the dark caudal mark. The salient differences in the color patterns between the juveniles and adults of both species are compared. The ontogenetic development of specific color marks is discussed. This new species is known only from Flores Island, Indonesia.

Introduction

In our recent study of some gobiid collections at the Florida State Museum, Gainesville, Florida, we discovered a new species of *Callogobius*, from Flores Island, Indonesia, which is most closely related to *C. mannarensis* Rangarajan (1970). There are more than 30 nominal species of *Callogobius*, some of which are undoubtedly synonyms. The genus is distributed from the northern Red Sea eastward to the Society Islands. Some species are wide ranging but others apparently are restricted to small geographical areas, such as an island, island group, gulfs and bays, or the temperate waters of Japan or southern Australia. Based on our knowledge of the systematics and distribution of the nominal forms, we speculate that *C. stellatus* and *C. mannarensis* are not widespread.

Characters shared by *C. stellatus* and *C. mannarensis* and not found in other species of *Callogobius* are: a reduced sensory pore system with only the nasal, anterior otic and intertemporal pores present; a vertebral number of almost always 11 precaudal and 15 caudal vertebrae; and a characteristic color pattern consisting of saddles on the body, an ocellus on the

proximal portion of the pectoral fin, a dark mark covering most of the caudal fin, and a dark oblique bar extending from the eye toward the opercle. A summary of certain characters of the nominal species of *Callogobius* is listed by McKinney and Lachner (1978).

The methods of taking and recording data are given in Lachner and McKinney (1974, 1978). The underscored item of certain characters includes the count obtained for the holotype.

Callogobius stellatus, new species

Figs. 1 and 3

Holotype.—USNM 217429, formerly UF 23762, female, 31.8 mm SL, Indonesia, Flores Island, Lesser Sunda Islands, 5 km west of Nangapanda, stone reef, in tide pools, collected by F. G. Thompson, 3 Aug. 1971, sta. no. FGT 1711.

Paratypes.—UF 23858, female, 31.9 mm SL; male (?), 18.7 mm SL, taken with holotype and bearing same data.

Diagnosis.—Characters differentiating *C. stellatus* from *C. mannarensis* follow: oblique dark bar extending downward and posteriorly from eye does not reach opercle and does not join nape saddle laterally in *C. stellatus*, whereas this bar extends onto the opercle and joins nape saddle laterally in *C. mannarensis*; a large dark oval-shaped mark present on fleshy base of pectoral fin on adults of *C. stellatus* (Fig. 2), absent or reduced to a small dark spot on upper fleshy base of fin in *C. mannarensis*; an intermediate distinct, dark saddle present on trunk between the two large trunk saddles and passing through origin of second dorsal fin in *C. stellatus*, but diffuse, incompletely developed or absent in *C. mannarensis*; anterior margin of dark caudal spot of adult *C. stellatus* is nearly vertical and bordered by pale basi-caudal bar, whereas the anterior margin of caudal spot of *C. mannarensis* is V-shaped and divides or nearly so the pale basi-caudal bar mid-laterally in adults. Some meristic differences between these two species are: pectoral fin rays 17–18, modally 18 in *C. stellatus*, 16–17, modally 16 in *C. mannarensis*; lateral scale rows about 28–31 in *C. stellatus*, about 33–35 in *C. mannarensis*. The body is more slender (Fig. 1) and the pectoral and caudal fins are more elongate (Table 1) in *C. mannarensis* than in *C. stellatus*.

Description.—Dorsal rays VI-I,10(3); anal rays I,8(3); pectoral rays 17(2), 18(4); pelvic rays I,5(3); segmented caudal rays 17(3); branched caudal rays 15(3); lateral scale rows 28–31(I); transverse scale rows 12–14(I); pre-dorsal scales absent.

Scales cycloid, smaller anteriorly than posteriorly on trunk; scales eccentric, focal area narrow; 28–30 primary radii and 2–4 secondary radii in large anterior field, 7–9 short primary radii and 1–3 secondary radii in small, posterior field.



Fig. 1. Upper: *Callogobius stellatus*, new species, USNM 217429, holotype, 31.8 mm SL, female, from Flores Island, Indonesia. Lower: *Callogobius mannarensis* Rangarajan, USNM 214113, 37.8 mm SL, male, from the Gulf of Mannar, southern India.



Fig. 2. *Callogobius mannarensis* Rangarajan, FMNH 78808, 31.0 mm SL, male, from the Gulf of Mannar, southern India, with a well developed ocellus on the pectoral fin.



Fig. 3. Upper: *Callogobius stellatus*, new species, FSM 23858, paratype, 18.7 mm SL, from Flores Island, Indonesia, showing juvenile coloration. Lower: *Callogobius mannarensis* Rangarajan, FMNH 78808, 19.0 mm SL, male, from the Gulf of Mannar, southern India, showing juvenile coloration.

Table 1. Proportional measurements, expressed in thousandths of the standard length, of *C. stellatus* with *C. mannarensis*.

Character	<i>C. stellatus</i>			<i>C. mannarensis</i>
	Holo-type	Para-type	Para-type	Five specimens
Standard Length (mm)	31.8	31.9	18.7	25.0-36.7
Head Length	236	235	278	234(210-248)
Snout Length	66	69	75	60 (52-63)
Bony Interorbital Width	35	38	37	35 (31-39)
Greatest Diameter of Orbit	35	34	37	34 (30-36)
Upper Jaw Length	72	72	75	66 (58-76)
Predorsal Length	333	339	358	336(305-348)
Greatest Depth of Body	145	160	139	131(116-145)
Pectoral Fin Length	305	307	321	347(336-372)
Pelvic Fin Length	236	235	273	231(223-240)
Caudal Fin Length	362	351	385	422(399-453)
Pelvic Fin Insertion to Anal Fin Origin	355	367	364	376(357-403)

Vertebrae 10 + 15(3); pterygiophore formula 3(22110) in 3 specimens (Birdsong, 1975:137).

Measurements for the holotype and two paratypes are given in Table 1 and compared with measurements of *C. mannarensis*.

A moderate-size species of *Callogobius*. Head depressed, trunk slightly compressed. Interorbital wider than diameter of eye; lower jaw protruding, gape oblique, jaw length short, not reaching vertical from anterior margin of eye; anterior and posterior nares arise from single bulbous structure, both nares open at tips of short tubes; tongue rounded anteriorly, its tip free; gill opening restricted to area anterior of pectoral-fin base; first dorsal fin not quite as high as second dorsal fin, first and second dorsal fins distinctly separate; origin of second dorsal fin slightly anterior to vertical from anal opening, posteriormost rays longest; adpressed pectoral fin extends posteriorly to about a vertical from second dorsal fin origin, pectoral fin longer than deep, its posterior margin rounded; pelvic fin moderate in length, extending about two-thirds distance from pelvic fin insertion to anal fin origin; pelvic frenum well developed, inner rays of pelvic fins joined nearly to tips; anal fin almost as high as second dorsal fin, posteriormost anal rays longest; caudal fin longer than head length, its posterior margin rounded. Genital papilla of female short and broad, wider than long, its tip bilobed.

Teeth in both jaws small, pointed, canine-like; two or three irregular rows of teeth anteriorly in each jaw grading to two rows posteriorly; teeth of outer row slightly larger than those of inner row anteriorly but

Table 2. Comparison of the salient differences in color patterns of juvenile and adult *C. stellatus* and *C. mannarensis*.

Character	<i>C. stellatus</i>		<i>C. mannarensis</i>	
	Adult	Juvenile	Adult	Juvenile
Cheek bar.	Oblique, extends to about angle of preopercle, not joining with nape saddle.	As in adults.	Horizontal or nearly so, extends to opercle and joins nape saddle.	As in adult.
Dark mark on fleshy pectoral-fin base.	Large, deep, oval.	Present on central portion.	Reduced to small spot on upper portion, or absent.	Usually absent.
Pectoral fin coloration.	Distinct ocellus.	Distinct ocellus.	Ocellus with or without supplementary dark marks.	Distinct ocellus.
Dark saddle at origin of second dorsal fin.	Conspicuous, narrow, extends to mid-body.	Conspicuous, but reduced and not extending to mid-body.	Absent, or elongate, diffuse dusky mark on mid-trunk and through anterior second dorsal fin, and separated by narrow pale area from similar dark mark dorso-laterally on trunk.	Faint marks, greatly reduced or absent.

Table 2. Continued.

Character	<i>C. stellatus</i>		<i>C. mannarensis</i>	
	Adult	Juvenile	Adult	Juvenile
Dark saddle through posterior second dorsal fin.	Oblique, broad, well developed; extends to mid-body or lower caudal peduncle.	Nearly vertical, broad, extends to lower caudal peduncle.	As in adult <i>C. stellatus</i> .	As in adult <i>C. stellatus</i> .
Caudal fin pigmentation.	Anterior border of large dark mark nearly vertical. Pale basi-caudal bar borders anterior margin of dark mark.	Anterior border of large dark mark crescent-shaped. Pale basi-caudal bar larger than on adult.	Anterior border of large dark mark wedge-shaped, dividing or nearly so the pale basi-caudal area mid-laterally.	Same as juvenile <i>C. stellatus</i> but angle of anterior border more acute.

teeth of inner row slightly larger posteriorly; no vomerine or palatine teeth.

The number, size, shape, and distribution of papillose ridges on the head and trunk of *C. stellatus* are identical to those depicted by McKinney and Lachner (1978) for *C. hastatus*.

The cephalic sensory pore system consists of the following bilaterally paired pores: nasals, anterior otics and intertemporals.

Color in preservation.—The salient color pattern of adult *C. stellatus* is shown in Fig. 1 and compared with that of *C. mannarensis*. Juvenile coloration of *C. stellatus* is depicted in Fig. 3.

Four, dark, narrow stripes radiating from eye, one from anterior margin of eye to rictus of jaw, another from posterior margin of eye to transverse papillose ridge behind eye, a third connecting eyes across interorbital region and widened at its central portion, and a fourth, a cheek bar, extending downward and posteriorly from eye to about angle of preopercle.

A broad, dark saddle across nape, its posterior margin touching a transverse line connecting upper pectoral fin insertions, and extending laterally to lower opercle. A broad, dark, vertical saddle extending through most of first dorsal fin and descending on trunk to belly.

The salient differences in the color patterns between *C. stellatus* and *C. mannarensis* and between the juveniles and adults are given in Table 2.

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